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The Soviet Defense Industry: Coping With the Military- Technological Challenge

A Research Paper

*D/SNA - This
is an excellent
paper. Due to be
presented. PLS. pass my
compliments to all those
who worked on it.
Rg.*

cc: DDI

001/170/0012/0045005

ROBERT M GATES
DEPUTY DIRECTOR OF CENTRAL INTELLIGENCE

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SOV 86-100601X

December 1986

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A Research Paper

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This paper was prepared by [redacted]
[redacted], Office of Soviet Analysis.
Contributions were provided by analysts from
SOVA, the Office of Scientific and Weapons
Research, and the Office of Imagery Analysis. [redacted]

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Comments and queries are welcome and may be
directed to the Chief, Defense Industries Division,
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SOV 86-10060JX

December 1986

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Coping With the Military-
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Summary

*Information available
as of 21 October 1986
was used in this report.*

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[redacted] the Soviets by the early 1970s were becoming increasingly worried about the growing military-technological challenge posed by the United States. Circumstantial evidence suggests the defense leadership was persuaded that its traditional approach of relying on superior numbers of weapons to offset Western technological advantages would not meet this challenge. Soviet military writings [redacted] indicate that key defense planners believed if the USSR was to compete effectively with the military power of the United States, the weapons industries required extensive and sustained modernization [redacted]

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Before the 1970s, the Soviets had paid greater attention to expanding production capacity than to improving manufacturing technology. Throughout the 1950s and 1960s, roughly two-thirds of capital investment in industry as a whole was devoted to construction, leaving on average less than one-third for the acquisition of machinery and equipment. Soviet literature, [redacted] of Soviet weapons suggest that the defense industry applied its investment funds in a similar manner. This policy, together with low replacement rates for obsolete machinery and equipment and the fact that even new defense plants were often equipped with machinery designed years earlier, resulted in a largely outdated manufacturing capability. [redacted]

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The Defense-Industrial Modernization Program

In the early 1970s, the Soviets began a comprehensive modernization of their defense industry. [redacted] for example, Lev Voronin, then Deputy Minister of the Defense Industry, supervised an upgrading of the entire tank industry, including the construction of modern manufacturing facilities and the installation of state-of-the-art machinery and equipment. [redacted] major capital improvements in other defense industries. Our analysis of the Soviet machinery sector—responsible for the production of consumer durables, investment goods, and military hardware—suggests that between the early and late 1970s the share of investment in the defense-industrial ministries increased substantially. [redacted]

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December 1986

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The USSR also embarked on programs designed to support this upgrading of the defense industries:

- There was a step-up in the development of advanced machine tools, computers, and microelectronic devices—equipment needed to produce advanced weapons and improve productivity. Much of this work was undertaken within the defense industry itself.
- As legal imports of Western plant and equipment soared in the early 1970s, the Soviets quickened the pace of their ambitious covert acquisition programs. Access to Western manufacturing equipment, processes, and know-how has enabled Soviet defense plants to introduce some advanced weapons into production up to five years earlier than would have been possible with indigenous capabilities.
- The Soviets improved the coordination between weapon designers and producers and tried to involve more than one ministry or plant in the co-operative production of a given weapon system, measures which have helped reduce unnecessary duplications of effort.

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This commitment to defense-industrial modernization appears to have been helped by the rise of Dmitriy Ustinov, who had been gaining favor, position, and power since the mid-1960s. He had long advocated Western-style management techniques, and the policies he implemented clearly indicate that he believed general economic growth and modernization to be the bedrock of the USSR's defense potential. His appointment to the position of Minister of Defense in 1976 and the subsequent appointment of like-minded subordinates probably signaled a coalescence of views on the broad guidelines of defense-industrial modernization policies.

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Results of the Program

The pace and scope of the defense-industrial modernization effort to date have been uneven. Much of the effort has been in the form of new plant and equipment rather than major retooling of existing facilities, suggesting that considerable renovation still needs to be done in older facilities. Moreover, the level of technology even in new production facilities often lags well behind the overall level in the West. Nevertheless, the expansion of manufacturing facilities and selected improvements in production technology have given the defense industries the plant and equipment needed to produce 90 percent of the hardware that the Intelligence Community is projecting will be deployed by the end of the decade, as well as the advanced weapons that we expect to be fielded through the early 1990s. Attesting to the progress the Soviets have made in modernizing their defense industries is the number of new systems already in production that demand relatively advanced manufacturing technology and equipment

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to meet requirements for miniaturized componentry, new materials, and complex surface geometries. These include T-80 tanks; MIG-29 and SU-27 interceptors; Sierra-, Oscar-, and Akula-class attack submarines; and SA-12 surface-to-air missiles. [REDACTED]

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The introduction and widespread application of more costly equipment sets and integrated production lines require more time than modernizing with the less sophisticated technology used in manufacturing earlier weapon systems. This probably accounts in part for the fact that a sharp increase in the expansion of floorspace in the mid-1970s was not—as had been the case in earlier periods of accelerated floorspace expansion—followed by an upturn in the growth rate of military hardware production. A larger number of defense-industrial facilities were producing at lower rates or not producing at all. [REDACTED]

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The rising dependence of the defense industries on materials and components produced by civil industry probably provided added impetus to Soviet efforts, begun in the late 1970s, to upgrade the increasingly antiquated civilian production base. Leonid Brezhnev introduced measures to share defense management expertise with the civilian sector, to apply the military model to spur scientific and technological progress, and to reorient the Academy of Sciences and universities to applied research. At the same time, growth in investment in the defense hardware ministries was scaled back and investment in civilian machine building accelerated. In 1985, Mikhail Gorbachev not only endorsed these measures but also further stepped up the provision of resources to civilian machine building (investment planned for civilian machine-building ministries in 1986-90 is 80 percent higher than the actual investment in 1981-85). His program singles out advanced machine tools, robotics, microelectronics, computers, automated management systems, and telecommunications for greater funding. In each of these areas, he has initiated technology development programs with extensive defense-industrial participation. [REDACTED]

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Outlook for Defense Industry

Over the next decade, Soviet defense industrialists will have to deal with a mixture of old and new challenges:

- We estimate that the costs of Soviet weapon systems have increased appreciably with the introduction of each new, more capable system within a given weapon class. Although modernization has helped the Soviets to increase productivity in the defense-industrial sector and to limit cost increases, the growing costs of technological development and exploitation will continue to drive up weapon costs, confronting designers and producers with pressures to economize.

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- More capable weapon systems probably will allow replacement of certain older military equipment on a less than one-for-one basis, easing the production burden but increasing the need for exacting tolerances and strict quality control.
- Retrofits of older equipment, now under way for a large portion of the Soviet arsenal, ease demands on weapon assembly plants; but suppliers of radioelectronic components and subsystems, computers, and advanced materials will be hard hit as they must support both new and retrofit programs.

The USSR probably will produce and deploy larger numbers of less capable weapons than the United States when doing so compensates for technological shortcomings or is a more cost effective way to meet military requirements. Moreover, the Soviets have often succeeded in translating technological achievements into weapon systems more rapidly than the West does. Thus, the technological levels of deployed Soviet and Western systems are more comparable than are the general levels of technology. Over the longer term, however, the Soviets are almost certain to place even greater emphasis on the development and manufacture of sophisticated weapons that require upgraded industrial technology. [REDACTED]

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This will be a tall order. Gorbachev must contend with increasing resource constraints, a government hobbled by organization and systemic barriers to quick progress, and an incentive system that still retards industrial innovation. He also faces an increasingly sophisticated and reinvigorated military challenge from the West, including the Strategic Defense Initiative. And his civil-industrial modernization program will compete for machinery and equipment resources with the ongoing modernization of the defense industries. Many defense plants, for example, need further upgrading with more precise and flexible computer-controlled machine tools, special equipment to process new structural materials, and sophisticated, nondestructive testing equipment. [REDACTED]

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Gorbachev's strategy seems directed in part at providing the requisite breathing space to give his investment policy a chance to work. Domestically, he apparently has convinced most of the leadership—at least for now—that the modernization of civil industry ultimately will benefit the defense industries and the military. In foreign policy, his recent arms control initiatives, summit diplomacy, and efforts to mend fences with Western Europe, Japan, and China are reminiscent of Soviet foreign policy leading up to the detente period of the 1970s. An improved East-West relationship—particularly if formalized by an arms control agreement—would buy

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Gorbachev more time to implement his domestic economic agenda. Even so, the competition between defense and those components of civil industries not directly supporting military-related production is likely to grow in the late 1980s and early 1990s as the Soviets begin to tool up for production of the next generation of weapons. If the performance of the civilian machine-building sector has not improved sufficiently by then, the Soviets will have to choose between delaying continued retooling of the defense industry or cutting back the ambitious goals for upgrading civil industry. [REDACTED]

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